Over the past three decades, China has experienced rapid economic growth and a fascinating transformation of its industry. However, much of this success is the result of industrial imitation and China’s continuing success now relies heavily on its ability to strengthen its indigenous innovation capability. In this book, Xiaolan Fu investigates how China can develop a strategy of compressed development to emerge as a leading innovative nation. The book draws on quantitative and qualitative research that includes cross-country, cross-province and cross-firm analysis. Large multi-level panel datasets, unique survey databases, and in-depth industry case studies are explored. Different theoretical approaches are also used to examine the motivations, obstacles and consequences of China’s innovation with a wider discussion around what other countries can learn from China’s experience. This book will appeal to scholars and policy-makers working in fields such as innovation policy, technology management, development and international economics and China studies.

XIAOLAN FU is Professor of Technology and International Development and Founding Director of the Technology and Management Centre for Development at the University of Oxford. Her research interests include innovation, technology and industrialisation; trade, foreign direct investment and economic development; emerging Asian economies; and innovation and productivity in the UK and US. She also has first-hand experience working in the business and academic sectors in China before coming to the UK.
Professor Fu has integrated a variety of scholarly articles from the firm level to the industry level to the national policy level, to produce the first comprehensive treatment of Chinese innovation activities from an open innovation perspective. Her masterful book points the way towards open innovation with Chinese characteristics.

Henry Chesbrough, Professor at UC Berkeley’s Haas School of Business and author of Open Innovation

That China is the workshop of the world is now a ‘given’. Professor Fu has invested years in the search for clues to how the goods in the China workshop have moved from being ‘assembled in China’ through ‘invented in China’ to ‘invented and commercialised in a complex open engagement with the world’s capital and skilled labour’. This book is the authoritative result and is essential reading.

Barbara Harriss-White, Emeritus Professor of Development Studies, Oxford University and co-editor of China-India: Pathways of Economic and Social Development

This fascinating book by a leading Chinese scholar is hugely informative of the challenges China faces in its quest to become a major global innovative economy. It populates a knowledge gap, challenges our conventional wisdom and provides important insights for corporate and government policy makers alike.

Raphael Kaplinsky, Professor of International Development, The Open University

China achieved an average annual growth rate of 9.8% for 35 years, made possible only by continuous technological innovations, after the transition from a planning economy to a market economy in 1979. Such a long period of extraordinary growth was unprecedented in human history. This book carefully studies China’s open national innovation system at national, regional and firm levels. It deciphers how China was able to achieve such a remarkable success in the past, examines how China may sustain dynamic growth in the future and suggests what other countries can learn from China’s success. The book is a must-read for anyone who wants to understand Chinese economic development.

Justin Yifu Lin, Professor, Peking University and Former Chief Economist, The World Bank

Finally, we have an analytical volume that combines economic theory, international experience, and China’s socio-economic conditions to formulate a most credible strategy to greatly strengthen China’s capacity to innovate. Xiaolan Fu’s ‘Open National Innovation System’ approach deserves careful study by other developing countries because it is also applicable to them.

Wing Woo, Professor, University of California at Davis and President, Jeffrey Cheah Institute on Southeast Asia, Malaysia
China’s Path to Innovation

XIAOLAN FU
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Contents

List of figures vii
List of tables x
Preface xiii
List of abbreviations xvii

Introduction 1
1 Introduction 3
2 Innovation in China since the reforms: An overview 15

Part I International knowledge transfer and technological takeoff 45
3 Foreign direct investment, absorptive capacity and regional innovative capabilities: Evidence from China 47
4 Processing trade, FDI and international competitiveness of the Chinese high-technology industries 74
5 Indigenous and foreign innovation efforts and technological upgrading in China 108

Part II Development of indigenous innovation capacity and catch-up 139
6 The role of state policy in shaping innovation practices: The case of open innovation in China 141
7 Open innovation as a response to constraints and risks 170
8 The dual role of universities in industrial innovation: comparing China and the UK 201
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Technological learning, tacit knowledge acquisition and industrial upgrading: The Chinese optical fibre and cable industry</td>
<td>236</td>
</tr>
<tr>
<td>10</td>
<td>Leapfrogging in green technology: The solar-PV industry in China and India</td>
<td>256</td>
</tr>
<tr>
<td></td>
<td><strong>Part III</strong> Towards a global innovation leader</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Internationalisation, reverse learning and capabilities upgrading: The case of Huawei and ZTE</td>
<td>279</td>
</tr>
<tr>
<td>12</td>
<td>International collaboration and radical innovation</td>
<td>314</td>
</tr>
<tr>
<td>13</td>
<td>Innovation efficiency and the cross-country gap in innovation</td>
<td>325</td>
</tr>
<tr>
<td>14</td>
<td>Capabilities, incentives, institutions and national innovation performance</td>
<td>358</td>
</tr>
<tr>
<td></td>
<td><strong>Conclusions</strong></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Conclusions: Open national innovation system and China’s path to innovation</td>
<td>381</td>
</tr>
<tr>
<td></td>
<td><strong>References</strong></td>
<td>396</td>
</tr>
<tr>
<td></td>
<td><strong>Index</strong></td>
<td>430</td>
</tr>
</tbody>
</table>
Figures

2.1 China’s R&D expenditure, 1995–2012 page 17
2.2 R&D expenditure in China and other economies, 1995–2012 18
2.3 Composition of R&D by types of activities: basic research, applied research and experimental development 19
2.4 R&D composition by funding sources, 2003–2011 20
2.5a Total number of R&D personnel 21
2.5b R&D personnel by executive entity, 2009 21
2.6 Comparison of R&D personnel per thousand employees in China and OECD economies, 2000–2011 22
2.7a Expenditure for acquisition of foreign technology in China, 2000–2012 23
2.7b Foreign technology imports in China, percentages, 2012 24
2.8 Number of patent applications vs number of granted patents, 1995–2012 25
2.9 Triadic patent families across BRICS, 1999–2011 26
2.10 Number of triadic patent families in China and other OECD economies, 1999–2011 27
2.11 Output of R&D: index articles published in international journals 28
2.12 Citations of scientific papers published, 2000–2010 28
2.13 Innovation performance: international comparison, 2012 29
2.14 R&D expenditures and intensity of enterprises in the above-scale manufacturing industries, 2012 30
2.15 Number of R&D personnel across sectors, 2009 31
2.16 Innovation output across industries: number of patent applications, 2010 32
2.17 Innovation outputs across industries: new product sales and new product export values, 2012 33
## List of Figures

2.18 Export and import volume of high-tech products, 1995–2012  
2.19 Innovation outputs by ownership of firms: new product sales and new product export values, 2012  
2.20 R&D expenditures across different ownership structures in industrial enterprises above designated size, 2006–2012  
2.21 R&D expenditures across different ownership structures in industrial enterprises above designated size, 2006 and 2012  
2.22 R&D personnel across different ownership structures in industrial enterprises above designated size, 2006–2012  
2.23 Patent applications across different ownership structures in industrial enterprises above designated size, 2009–2012  
2.24 New product sales and new product exports across different ownership structures in industrial enterprises above designated size, 2009–2012  
2.25 R&D expenditures and R&D/GDP ratios across China, 2012  
2.26 R&D expenditures across China, 2000 and 2012  
2.27 Ratio of R&D expenditures in GDP across China, 2000 and 2012  
2.28 Mean patent application numbers across China, 2000 and 2012  
2.29 R&D funding sources across China, 2009  
3.1 Trade and FDI in China, 1985–2004  
3.2 Regional distribution of FDI stock in China, 2005  
3.3 Regional distribution of number of invention applications, 2004  
3.4 Regional distribution of sales of new products, 2004  
3.5 Regional distribution of industrial R&D, 2004  
3.6 Innovation activities: foreign and indigenous enterprises in China, 2004  
3.7 Regional innovation efficiency, China  
4.1 Share of processing exports in China’s total high-technology exports  
4.2 Percentage of processing exports in total exports, electronic industry of China, 2006
List of figures

5.1 Technical efficiency by ownership and technology category 122
5.2 TFP growth in Chinese manufacturing firms, 2001–2005 123
5.3 Distribution of firms on the frontier 124
5.4 Technical change and efficiency improvement in Chinese manufacturing firms, 2001–2005 125
8.1 Percentage of innovative Chinese firms reporting R&D collaboration with various types of partners 216
8.2 Percentage of Chinese firms reporting R&D collaboration with universities in various countries 216
8.3 Percentage of UK firms reporting R&D collaboration with various types of partners 226
8.4 Percentage of UK firms reporting R&D collaboration with universities in various countries 227
9.1 The production chain in the optical fibre and cable industry 242
10.1 Technology transfer and indigenous knowledge-creation mechanisms adopted by solar-PV industry in China and India 269
10.2 Mixing and sequencing of technology creation and acquisition mechanisms in solar-PV industry in China and India 270
11.1 Stock of China’s outward direct investment, mil$ 284
11.2 Manufacturing firms with overseas investment 286
11.3 Main incentives for investing in developed countries 286
11.4 Main incentives for investing in developing countries 287
11.5 The reverse learning chain from customers 298
13.1 National innovation system: a system theoretic framework 330
13.2 Total national R&D as percentage of GDP for major industrial countries 333
13.3 Patents granted by USPTO, 1982–2006 334
13.4 Patenting capacity of selected countries 347
13.5 Patenting efficiency of selected countries 347
13.6 Expected innovation capacity: emerging economies 349
13.7 Actual performance: patents granted by USPTO 350
13.8 Innovation efficiency of emerging economies 351
14.1 National innovation performance 360
Tables

3.1 FDI intensity: share of foreign assets in total industrial assets  
3.2 Expenditure on technology acquisition, 2004  
3.3 Growth rate of R&D expenditure  
3.4 Impact of FDI on regional innovation capacity  
3.5 Impact of FDI on regional innovation efficiency  
3.6 The FDI-innovation-growth linkage in the coastal and inland regions  
4.1 Summary statistics of the variables  
4.2 Exports and innovation indicators of domestic and foreign firms, 2007  
4.3 Export performance of top 10 exporting high-technology industries: SIC four-digit level, 2007  
4.4 Probit model estimates of export decisions in the high-technology industry  
4.5 Spillovers from PT-FDI and export value of domestic firms  
4.6 Determinants of export performance in industries with fast indigenous export growth: IV estimates  
4.7 Spillovers from PT-FDI and export performance of indigenous firms: IV estimates of alternative spillover measurements  
5.1 Summary statistics of the variables  
5.2 Determinants of TFP growth and technical change: GMM estimates of full sample of domestic firms  
5.3 Determinants of technical change: GMM estimates by industry group  
5.4 Determinants of efficiency improvement: GMM estimates by industry group  
6.1 Sources of product innovation  
6.2 Sources of process innovation
### List of tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3</td>
<td>The importance of information sources in innovation activities</td>
<td>145</td>
</tr>
<tr>
<td>6.4</td>
<td>The main public policies for open innovation in China</td>
<td>156</td>
</tr>
<tr>
<td>6.5</td>
<td>Selected cases of open innovation in Chinese firms</td>
<td>160</td>
</tr>
<tr>
<td>6.6</td>
<td>Types of innovation mode and frequencies</td>
<td>164</td>
</tr>
<tr>
<td>7.1</td>
<td>Descriptive statistics and correlations</td>
<td>183</td>
</tr>
<tr>
<td>7.2</td>
<td>Determinants of breadth of openness: ordered-Logit model estimates</td>
<td>184</td>
</tr>
<tr>
<td>7.3</td>
<td>Determinants of depth of openness: ordered-Logit model estimates</td>
<td>186</td>
</tr>
<tr>
<td>7.4</td>
<td>Robustness check using OLS</td>
<td>188</td>
</tr>
<tr>
<td>7.5</td>
<td>Firms' responses to constraints and risks by ownership</td>
<td>191</td>
</tr>
<tr>
<td>7.6</td>
<td>Effects of constraints and risks by size and industry</td>
<td>194</td>
</tr>
<tr>
<td>8.1</td>
<td>Definition of variables</td>
<td>212</td>
</tr>
<tr>
<td>8.2</td>
<td>Universities and firm innovation in China: Tobit model estimates</td>
<td>218</td>
</tr>
<tr>
<td>8.3</td>
<td>Robustness check: Generalised Tobit model estimates</td>
<td>221</td>
</tr>
<tr>
<td>8.4</td>
<td>Robustness check: instrumental variable model estimates</td>
<td>224</td>
</tr>
<tr>
<td>8.5</td>
<td>Universities and firm innovation in selected university-concentrated cities in China</td>
<td>225</td>
</tr>
<tr>
<td>8.6</td>
<td>Universities and firm innovation in the UK: standard Tobit model estimates</td>
<td>228</td>
</tr>
<tr>
<td>9.1</td>
<td>Perception of the technological characteristics of the optical fibre and cable industry</td>
<td>244</td>
</tr>
<tr>
<td>9.2</td>
<td>Definition of variables</td>
<td>245</td>
</tr>
<tr>
<td>9.3</td>
<td>Factor analysis</td>
<td>247</td>
</tr>
<tr>
<td>9.4</td>
<td>Knowledge sources and technological learning</td>
<td>249</td>
</tr>
<tr>
<td>9.5</td>
<td>Does the embeddedness of tacit knowledge in the industry matter?</td>
<td>251</td>
</tr>
<tr>
<td>9.6</td>
<td>Does the embeddedness of tacit knowledge in the industry matter?</td>
<td>252</td>
</tr>
<tr>
<td>10.1</td>
<td>Renewable technology targets for 2020 in China</td>
<td>263</td>
</tr>
<tr>
<td>10.2</td>
<td>Renewable technology targets for 2022 (end of 13th Plan) in India (in MW)</td>
<td>265</td>
</tr>
<tr>
<td>10.3</td>
<td>Details of leading solar-PV companies in China and India</td>
<td>266</td>
</tr>
<tr>
<td>10.4</td>
<td>Sustainability-oriented innovation systems of China and India</td>
<td>272</td>
</tr>
</tbody>
</table>
xii  

List of tables

11.1 Industry distribution of China’s OFDI: by FDI stock and number of subsidiaries, 2010 285
11.2 Innovativeness of firms: comparing firms with and without OFDI 288
11.3 Huawei’s history of alliances 301
12.1 Collaborative innovation activities 317
12.2 Types of collaborators and regional distribution 318
12.3 The impact of collaboration on innovation performance in Chinese firms: Tobit model estimation results 319
12.4 The impact of international collaboration on novel innovation in China: Tobit model estimation results 321
13.1 Definition and sources of variables 341
13.2 Stochastic frontier analysis of basic patenting capacity 342
13.3 Determinants of patenting efficiency 344
Preface

This book is an outcome of my research on innovations in China over the past 10 years. I started my research on innovation as a project team member of a Cambridge-MIT joint project on ‘International Innovation Benchmarking’, which compared innovation activities in Europe, the UK in particular, and the United States. Innovations were a key area of concern for policy makers and business managers, as well as the academic scholars. Although China’s economic reforms started in 1978, up to the early 2000s the Chinese economy had been driven by system reforms, investment, exports and foreign direct investment (FDI) at different periods. Innovation was still a concept that had never really come to the centre of China’s development strategy, nor had it arrived at the debate on the drivers of its long-term economic growth. Having witnessed the competition among industrialised countries for leadership in innovation and the priority that has clearly been given to skills and innovation in policy making in these countries, I started my pursuit to understand how to build innovation capabilities in a developing country such as China. I strongly believe that this will be a crucial area for China, not only for academic research but also for policy making and business management in the real-world context. In fact, without much waiting, the Chinese government began to change its development strategy in 2006. It placed development of indigenous innovation as the top priority in its official national development plan.

As a researcher who has a strong interest in China’s industrial competitiveness and its external trade and investment, I have worked extensively in these areas; hence, I started my research quest from my understanding of the sources of innovative knowledge and technology in China and the processes of innovation diffusion. I gradually moved on to researching the conditions and processes of innovation creation in developing countries. I also examined the relationship between different paths at different stages of development of a country, their advantages and disadvantages and the conditions for effectiveness of each path. My
past work experiences and interest in studying innovations in the developed and other developing countries allowed me to examine China’s path from an international comparative perspective. This has formed the basic structure and approach of research that I present in this book.

*China's Path to Innovation* is a combination of a selected number of my published journal papers and several new studies on some of the most recent topics regarding China’s ongoing transformation from imitation to innovation. It is a serious academic book based on 10 years of research and reflection. All published and unpublished new papers are selected and organised to provide a systematic, comprehensive and coherent study of China’s path to innovation, although each chapter is fairly self-contained. Journal publication offers a great advantage that one’s research comes under close scrutiny through the peer review process and can benefit greatly from it. My aim is to publish the more original parts of the book in this way with updated data and information. The hope is that the whole will add up to more than the sum of its parts and that we can identify and develop a general model of the technology development strategy of the developing countries based on a series of peer-reviewed, in-depth studies of individual factors, mechanisms and cases.

Many acknowledgements and thanks are due. Since 2005, my research on innovation and on China has been supported by substantial grants from the Economic and Social Sciences Research Council (ESRC), the Engineering and Physics Sciences Research Council (EPSRC), the British Academy, the Cairncross Foundation and the State Administration of Foreign Experts Affairs (SAFEA) of China. I thank these bodies for their financial support and for the confidence that they have shown in my research.

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Preface


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Preface

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Xiaolan Fu
Abbreviations

ABC  Absorptive capacity
CDB  China Development Bank
CDMA Code division multiple access
CILG Central innovation leading group
CIS  Community Innovation Survey
COEs  Collective-owned enterprises
CPO  Chinese State Intellectual Property Office
DEA  Data envelopment analysis
EIS  European Innovation Scoreboard
EP  Export processing
EPZs Export processing zones
EU  European Union
FDI  Foreign direct investment
FIEs Foreign invested enterprises
GDP  Gross domestic products
GLLAMMs Generalized linear latent and mixed models
GMM  Generalised method of moments
GVC  Global value chains
HKTM firms Hong Kong, Taiwan and Macao firms
HMT  Hong Kong, Macau and Taiwan
ICT  Information and communication technology
IMD  Institute for Management Development
IPR  Intellectual property rights
ITU  International Telecommunication Union
JV  Joint venture
MLEs Medium- and large-sized enterprises
MNEs Multinational enterprises
MOST Ministry of Science and Technology of China
MSTI Main science and technology indicators
NIEs Newly industrialised economics
List of abbreviations

NIP  National innovation performance
NIS  National innovation system
OBM  Original brand manufacturers
ODM  Original design manufacturers
OECD Organisation for Economic Co-operation and Development
OEM  Original equipment manufacturers
OFDI  Outward foreign direct investment
OI  Open innovation
OLS  Ordinary least squares
ONIS  Open national innovation system
OT  Ordinary trade
POEs  Privately owned enterprises
PRIs  Public research institutions
PT-FDI  Processing trade–FDI
R&D  Research and development
REF  Research excellence framework
S&T  Science and technology
SEZs  Special economic zones
SFA  Stochastic frontier analysis
SHCs  Shareholding companies
SMEs  Small and medium enterprises
SOEs  State-owned enterprises
SSB  State Statistical Bureau
STP  Strategic technology partnering
TFP  Total factor productivity
UNCTAD United Nations Conference on Trade and Development
USPTO  United States Patent and Trademark Office
WBDI  World Bank development indicators
WCY  World Competitiveness Yearbook
WFO  Wholly foreign owned
WTO  World Trade Organization
ZTE  Zhongxing Telecommunications Equipment Corporation